

Remarks

Reconsideration and allowance of all claims are respectfully requested in view of the amendments and remarks presented. Claims 1-28 remain pending.

Initially, Applicants have amended paragraph [0064] of the specification to correct a typographical error. Entrance of this amendment is requested.

By this paper, independent claims 1, 10, 19 & 20 are amended to more clearly point out and distinctly claim the subject matter of the present invention. Although Applicants believe that certain of these aspects were initially presented in the claims, the amendments are submitted in a *bona fide* attempt to further prosecution of the application. Support for the amended language can be found throughout the application as filed. For example, support for “selecting source-based routes” is presented in FIGS. 10A & 10B, as well as the accompanying discussion thereof, and support for the selection of “static path”, source-based routes is provided, for example, in the problem statement of paragraphs [0008] – [0010] wherein the approach of the present invention seeks to overcome problems with prior static path methods for pre-computing routes of a network. Additionally, support for generating static path, source-based routes is found in, for example, FIG. 9, wherein each selected route is saved for future use in transferring one or more packets. Thus, no new matter is believed added to the application by any amendment presented.

In the Office Action, claims 1-2, 6-8, 10-11, 15-17, 19-20 & 25-27 were rejected under 35 U.S.C. §102(b) as being anticipated by Huang (U.S. Patent No. 5,841,775; hereinafter Huang), claims 3-5, 12-14 & 22-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Huang in view of Kahale et al. (U.S. Patent No. 6,314,084; hereinafter Kahale), and claims 9, 18 & 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Huang in view of Cwilich et al. (U.S. Patent No. 6,498,778; hereinafter Cwilich). These rejections are respectfully, but most strenuously, traversed to any extent deemed applicable to the amended claims presented herewith, and reconsideration thereof is requested.

Before discussing the invention and the applied art, Applicants reiterate below certain information contained in the “Background of the Invention” section of this application, in order that the problem addressed by the present invention be well understood:

[0008] *One consideration in the operation of any switching network is that routes used to move messages should be selected such that a desired bandwidth is available for communication. One cause of loss of bandwidth is unbalanced distribution of routes between source-destination pairs and contention therebetween. While it is not possible to avoid contention for all traffic patterns, reduction of contention should be a goal. This goal can be partially achieved through generation of a globally balanced set of routes. The complexity of route generation depends on the type and size of the network as well as the number of routes used between any source-destination pair. Various techniques have been used for generating routes in a multi-path network. While some techniques generate routes dynamically, others generate static routes based on the connectivity of the network. Dynamic methods are often self-adjusting to variations in traffic patterns and tend to achieve as even a flow of traffic as possible. Static methods, on the other hand, are pre-computed and do not change during the normal operation of the network.*

[0009] *While pre-computing routing appears to be simpler, the burden of generating an acceptable set of routes that will be optimal for a variety of traffic patterns lies heavily on the algorithm that is used. Typically, global balancing of routes is addressed by these algorithms, while the issue of local balancing is overlooked, for example, because of the complexity involved.*

[0010] *Thus, a need remains in the art for a route generation technique that generates routes that are balanced both globally and locally in switching networks which support multiple paths between source-destination pairs.*

With this background, Applicants' invention presents a static route generation technique that generates static path, source-based routes that are balanced both globally and locally for a switching network which supports multiple paths between source-destination pairs. In one aspect, Applicants recite a method (e.g., claim 1), system (e.g., claims 10 & 19), and computer

program product (e.g., claim 20), for generating routes for routing data packet in a network of interconnected nodes. The nodes are at least partially interconnected by links. Applicants' route generation technique includes: generating static path, source-based routes for routing data packets in the network of interconnected nodes. The generating of static path, source-based routes includes: (i) selecting a source node – destination node (S-D) group with common starting and ending sets of links from the network of interconnected nodes; and (ii) selecting shortest static path, source-based routes between at least some S-D nodes of the S-D group so that: (a) selected static path, source-based routes substantially uniformly fan out from the source nodes to a center of the network and fan in from the center of the network to the destination nodes; (b) local balance of static path, source-based routes between selected S-D nodes of the S-D group passing through links that are at the same level of the network is achieved; and (c) global balance of static path, source-based routes passing through links that are at a same level of the network is achieved. No similar functionality is believed taught or suggested by the known art, including the applied patents.

Huang describes a scalable switching network wherein routers provide destination routing. A switching fabric of routers is used to implement a scalable switching network. The switching fabric supplies the connectivity. The routers supply the routing, maintenance, and administrative functions. The switching fabric and routers cooperate to reduce hardware, delay, and jitter; and provide fault tolerance, internal load balancing, input load balancing, output load balancing, and shared distributed output buffering. (See column 5, lines 26-34 of Huang.)

As explained at column 1, lines 28-39 of Huang, there are two basic approaches to providing routing needed to support switching or routing. One approach is destination-based, such as the Internet. The other approach is path-based, such as the telephone network. Destination routing is based on a table look-up at each decision point. It is flexible since it is loosely coupled with the topology of the network, however, the routing decisions are more complex since knowledge of the overall network is required at each decision point. In path-based routing, all the routing decisions are pre-determined and represented by the telephone number or address. This is tightly coupled to the topology of the network.

In the language of paragraphs [0008] – [0010] of the present application, Huang is a destination routing technique wherein the routers dynamically generate routes based on traffic

patterns within the network. In comparison, the present invention is directed to a path-based routing approach, which is referred to in Applicants' claims as a "static path, source-based routing". Thus, there is a fundamental difference between the routing approach of Huang and Applicants' recited routing technique. Huang relates to a network in which routers provide destination routing, i.e., the routers are active devices that dynamically decide the port through which an incoming packet is to be sent. In comparison, Applicants recite a type of path-based routing, that is, the generating of static path, source-based routes. In Applicants' approach, the network routers are passive devices that send incoming packets through an output port coded into the path or route sent along with the packet from the source. Thus, Applicants' routes are static path, source-based routes. In view of this fundamental difference, and the amendments to the independent claims presented, Applicants respectfully request reconsideration and withdrawal of the anticipation rejection to the independent claims based on Huang. There is no teaching of generating static path, source-based routes in Huang having the characteristics noted in Applicants' independent claims.

For example, Applicants' independent claims recite that the generating of the static path, source-based routes includes selecting the shortest static path, source-based routes between at least some source-destination nodes of the source-destination group so that local balance of the static path, source-based routes between selected S-D nodes of the group passing through links that are at the same level of the network is achieved, and global balance of the static path, source-based routes passing through links that are at the same level of the network is achieved. As defined at paragraphs [0043] & [0044] of the present application, a system is "globally balanced" if there are a same or a substantially same number of routes passing through links that are at a same level of the network. That is, a globally balanced network is a network wherein links at the same level of the network carry a same static load. "Local balancing" refers to the spread of the source-destination pairs whose routes pass through an individual link of the network. Local balance means that there is a substantially uniform selection of source-destination pairs whose routes pass through a link from a complete set of source-destination pairs whose routes can pass through a link.

Applicants respectfully submit that a careful reading of Huang fails to uncover any facility for generating static path, source-based routes for routing data packet in a network which includes selecting shortest static path, source-based routes so that both local balance and global

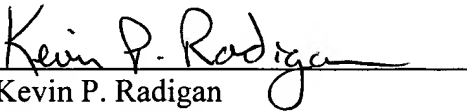
balancing of the routes is achieved as the terms are defined in the present application and employed in the independent claims at issue. For these additional reasons, reconsideration and withdrawal of the anticipation rejection to the independent claims based upon Huang is respectfully requested.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations. Kahale and Cwilich are applied as secondary references in the above-noted obviousness rejections to certain dependent claims. Without acquiescing the characterizations of these patents and their alleged applicability to Applicants' dependent claims, Applicants note that neither Kahale or Cwilich describe generating static path, source-based routes for routing data packets in a network of interconnected nodes. Kahale describes a transmission system which models changing characteristics of a transmission medium to dynamically schedule transmission links. Cwilich describes a method and system for computing an optimal restoration capacity and/or optimal restoration paths for a network to resolve a restoration scenario by solving a linear program model. Since neither of these patents teaches or suggests generating static path, source-based routes for routing data packets in a network of interconnected nodes *per se*, then Applicants respectfully submit that their particular approach for generating such routes as recited in the independent claims would not have been obvious to one of ordinary skill in the art based upon any combination of Huang, Kahale and Cwilich.

For at least the above reasons, Applicants respectfully submit that all claims are in condition for allowance and such action is respectfully requested.

If a telephone conference would be of assistance in advancing prosecution of the subject application, Applicants' undersigned attorney invites the Examiner to telephone him at the number provided.

Respectfully submitted,

A handwritten signature in black ink, reading "Kevin P. Radigan", is written over a horizontal line.

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